Book Review

Eugene Narmour. *The Analysis and Cognition of Basic Melodic Structures: The Implication Realization Model.* Chicago: University of Chicago Press, 1990.

Reviewed by Raymond Foster

In *Beyond Schenkerism*,[1] Eugene Narmour promised a future volume devoted to a detailed explanation of the implication-realization model of analysis. Nearly fifteen years later, it is finally here, and no small effort: *The Analysis and Cognition of Basic Melodic Structures* is only the first of a projected four-volume set.[2] Despite flaws in some areas, this book will be very important to theorists interested in melodic analysis and music cognition. Also, because this is only the first volume of a multi-volume set, it is incomplete in certain aspects which may be covered in the subsequent volumes. Thus, while it is impossible to make a final judgment of this book, because of its incompleteness, Narmour has done an admirable job of bringing together a wide range of resources to construct this theoretical model.

Summary

Little of Narmour's work after *Beyond Schenkerism* has appeared in American journals commonly read by music theorists, so a detailed summary of this book may prove useful to many readers. The book is

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[1]Eugene Narmour, *Beyond Schenkerism: The Need for Alternatives in Music Analysis* (Chicago: University of Chicago Press, 1977).

[2]The second volume, *The Analysis and Cognition of Melodic Complexity: The Implication-Realization Model*, is near publication as this review goes to press.

arranged in five parts: (1) "Conceptual Background"; (2) "Some Basic Structures"; (3) "Theoretical Background"; (4) "The Remaining Basic Structures"; and (5) "Conclusion." In his preface, Narmour makes explicit several goals of the book as well as his theoretical agenda. His primary goal is to "discover and explain melodic syntax on the lowest level" (ix). To achieve this goal, he has adopted several "radical" stances (his own description). First, his theory is independent of any style context. Second, there is a great emphasis on the listener's cognitive performance. This leads Narmour to invoke Gestalt laws of similarity, proximity, and common direction, which he then uses to hypothesize two basic principles of structure: *process* and *reversal*. The third, and perhaps most "radical" stance taken by Narmour is his analytical perspective: this is primarily a book about low-level, note-to-note relations, rather unusual in a time when there is such emphasis in music theory on high-level structure.

Narmour's first general claim is that there are two universal formal hypotheses, which may be represented symbolically as:

$A + A \rightarrow A$

$A + B \rightarrow C$

(where "$\rightarrow$" = "implies")

At the risk of oversimplification, this means that repetition implies further repetition, contrast implies further contrast. The second general claim is that these forms generate either closure or nonclosure in some degree. It is Narmour's argument that no understanding of any of the typical means by which we express musical structure (transformations, hierarchical levels, archetypical patterns, form in its more traditional sense, etc.) is possible without considering these two claims.

While the concept of implication and its complimentary concept, realization, are central to this theory, as should be clear from the two statements above, another important concept is the "parametric scale." A parametric scale is part of the bottom-up system of perception, that part which determines, for example, when two entities are similar or different, or whether closure has occurred and its degree. Another basic tenet of the theory is that small intervals generate implications of similarity, while large intervals generate implications of differentiation.

Narmour identifies twelve primary melodic archetypes, listed here

with the symbols used to represent them and an explanation of the elements that create each (4-6):[3]

1: Process [P]: small interval to small interval, same registral direction
2: Registral process [VP]:[4] (A + A, nonclosural) small interval to large interval, same registral direction
3: Intervallic process [IP]: small interval to small interval, different registral direction
4: Duplication [D]: lateral registral direction
5: Intervallic duplication [ID]: small interval to the same small interval, different registral direction
6: Reversal [R]: (A + B, closural) large interval to small interval, different registral direction
7: Registral reversal [VR]: large interval to even larger interval, different registral direction
8: Intervallic reversal [IR]: large interval to small interval, same registral direction
9: Exact registral return [aba]: a series of three pitches where the first and third tones are the same
10: Near registral return [aba1]: a series of three pitches where the first and third tones differ by no more than a major second
11: Dyads [1,2,3,...]: two-element groupings, the unrealized implications of processes and reversals
12: Monads [M]: one-element groupings, closed or unclosed, where no generation of implication occurs

The first eight archetypes receive the most detailed treatment in this

[3]The archetypes are listed here as they appear in Appendix I (pp. 426-428). Narmour's explanation in Chapter 1 separates them into several different categories for conceptual reasons, but in application they can be considered as a single group.

[4]"V" represents registral direction; the mnemonic for "V" is vector, although this is slightly inaccurate, as vectors in mathematics possess both direction and magnitude. The element of registral direction in Narmour's system possesses only direction.

book, as the last four do not produce implication, though exact and near registral return may produce closure. The pure form of process is nonclosural and implies continuation in the same manner, while the pure form of reversal produces closure. The partial forms of both process and reversal produce varying degrees of both closure and nonclosure.

More complex structures are created by combining and chaining. Combining occurs when two or more structures share intervals, and is similar to the traditional concept of elision: the terminus of one structure becomes the beginning of another structure. Chaining is a special case of combining, when three or more structures share intervals. This obviously can make for rather complicated structures out of a relatively simple set of constraints.[5]

As the last basic part of the system to be discussed, Narmour defines his conceptions of structure and closure. Structure here does not equal transformation: melodic structuring occurs at all levels. Furthermore, closure in this book does not refer exclusively to major musical convergences in several musical parameters (although presumably it would include those). Narmour defines three broad categories of closure (11):

1. Articulation: weak but noticeable closure on lower levels
2. Formation (after Piaget): moderately strong closure ". . . that portends a higher level but nevertheless remains wedded to the level of its occurrence."
3. Transformational: strong closure in the traditional sense, where a new hierarchical level comes to pass.

Narmour begins discussion of the influence of style on implication with a rather bold statement:

> Contrary to what many psychologists and music theorists believe, tonal style does not exist, nor has it ever existed, as a

[5]Narmour notes that most discussion of conditions that lead to chaining is reserved for the second volume (10).

> circumscribed, cognitive whole. In terms of theoretical hypotheses governing implication, we cannot operationally abstract it, nor inspect it, nor generalize about it, with either great certainty or confidence. (20)

While musical style is the starting point for most musical theories, Narmour argues in Chapter 2 that musical style cannot form the basis for a perceptual theory of implication.[6] Narmour wants to base his theory on hypotheses, not axioms, and gently reminds us here of one of his chief criticisms of Schenkerian theory.[7] One problem with basing a theory on style is that style knowledge varies significantly from person to person: "Presumably, trombonists do not stylistically hear Baroque concerti the same way string players do"(21).[8]

Another problem Narmour notes concerning the use of style as the basis of a cognitive theory is that it is too difficult to define style in terms of if-then statements: these invariably turn into "if-then-except" statements. Narmour then gives a lengthy example of the futility of such an approach using a relatively homogeneous sample of music: an assortment of excerpts beginning with melodic perfect fourths from the solo keyboard music of Bach and Handel. Yet despite an ever-increasing restrictiveness on various parameters of the music (to the point that the small size of the resulting sample makes generalization of almost any conclusion meaningless), it is impossible to produce a simple rule for predicting the continuation of this single interval without a plethora of exceptions attached.

As the conclusion of this chapter, Narmour discusses the role of

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[6]One is tempted to draw parallels here with Lerdahl and Jackendoff: parts of their theory also seek to go beyond the boundaries of style as a theoretical basis, though for different reasons. Lerdahl and Jackendoff, like Narmour, invoke the perceptual principles of Gestalt psychology in formulating their theory. See their *A Generative Theory of Tonal Music* (Cambridge: MIT Press, 1986).

[7]See *Beyond Schenkerism*, Chapter 2.

[8]Theorists as a whole, the majority of whom are keyboardists, might do well to remind themselves frequently of this fact.

style in overall perception. The concept of class representation is important here (32): "From the listener's perspective, style is the replication of experience. . . . In short, style influences implication by first existing as a structural complex of parametric relations. It operates directly on learned structures of relations influencing input shapes like single melodic intervals only as such shapes occur within learned style structures." Narmour here returns to a distinction made in *Beyond Schenkerism*, that of *style shape* vs. *style structure*.[9] Briefly, style shapes are basic properties of individual parameters. The size of interval used in a style would be an example: in the West we are accustomed to twelve notes per octave; other cultures may use different interval systems. Style structures, on the other hand, are complex structures involving several parameters. To illustrate this distinction, and the important concepts of intra- and extraopus style, Narmour leads us through a hypothetical listening experience of a Mahler song from the viewpoint of a listener only familiar with late seventeenth-century music.

Despite the problems involved, Narmour recognizes that style is a necessary element in the analysis of music. In Chapter 3 Narmour details a two-part cognitive model, drawing on recent work in cognitive psychology, consisting of top-down and bottom-up elements. Continuing on the topic of the Baroque example from the previous chapter, Narmour notes that the addition of further constraints has the effect of moving the problem ". . . from a simplex relation to a complex one, from a context-free condition to a context-sensitive one" (44); in other words, from a bottom-up problem to a top-down problem. What we are left with is a "paradox of style," where parametric style shapes (bottom-up) and complex style structures (top-down) interact with one another, sometimes in agreement, sometimes in conflict.

Style shapes are abstracted from style structures, while style

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[9]In *Beyond Schenkerism*, Narmour used the term "style form," as did Gjerdingen in discussion of similar concepts. See Robert Gjerdingen, *A Classic Turn of Phrase: Music and the Psychology of Convention* (Philadelphia: University of Pennsylvania Press, 1988).

structures are constructed out of style shapes. This would, on the face of it, seem to be a circular argument. However, Narmour clears that problem by asserting that style structures are the true foundation of all perception. Nowhere is this more apparent than in the explanation of how new style structures are learned. Perception of style shapes is essential to the learning of new style structures, as style structures are ". . . nothing more than the sum total of their style shapes. . . . Operationally assimilating style shapes is therefore essential in enabling listeners to correct 'mistaken' perceptual anticipations based on learning" (50).

This leads to the cognitive basis of the entire implication-realization system: two expectation systems, operating simultaneously. This larger process can now be modelled as an if-then-except hypothesis, where "if" and "then" are controlled by the bottom-up process, and "except" is controlled by the top-down process.

We know at this point how style structures influence expectation and how they come about, but how does a style shape create implication? To answer this question, Narmour turns to the Gestalt principles of pattern perception. Narmour has voiced a number of criticisms of the invocation of Gestaltist ideas in musical analysis, but these are directed toward the top-down figures. To avoid problems with these less-defined, top-down principles, such as good continuation and good figure, Narmour applies only the concepts of similarity, proximity, and common direction, since these can be rigorously defined and measured.[10] These concepts become the guiding principles of implication for style shapes. A learned style structure may interfere with the implication of the style shape, but it does not subsume the implication of the style shape; rather, they exist alongside each other. This is one way that Narmour accounts for aesthetic experience in repeated hearings of a work.

Chapter 5 provides the justification for the basic structures

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[10]In addition, their validity has been well-established by experimental testing. See, for example, Diana Deutsch, "Grouping Mechanisms in Music," in *The Psychology of Music*, ed. Deutsch (New York: Academic Press, 1982).

alluded to earlier. The bottom-up Gestalt principles of similarity, proximity, and common direction do not depend on the existence of a "prior whole," so they do not imply closure in the customary sense. In the implication-realization model, Gestalt principles act as ". . . prospective, non-interpretive, bottom-up, nonclosural organizations affecting style shapes rather than as retrospective, interpretive, top-down, closural organizations emanating from previously learned style-structural complexes" (74). Greatly simplified, implication of continuation is the result of bottom-up processing; implication of closure is the result of top-down processing.[11]

Narmour applies the bottom-up Gestalt principles to three aspects of melody: registral direction, intervallic motion, and pitch specificity. The basic hypothesis is that small intervals (defined as the unison up to and including the major third) imply similarity in intervallic motion and registral direction. Intervals of a minor sixth or larger imply reversal of registral direction and intervallic motion.[12]

One of the more important concepts that Narmour explains in this chapter is the *syntactic parametric scale*, a continuum of values which represents the implicative properties of the elements within a given parameter. The syntactic parametric scale for intervals, for example, is a continuum from small to large intervals, with a corresponding continuum of implication from continuation to reversal. Syntactic parametric scales have 4 primary characteristics (80-81): 1) they are domain specific, subconscious, and automatic, governing the implication of syntactic primitives (style shapes); 2) they are "hardwired" in our neuronal systems, i.e., innate; 3) they are brute, panstylistic, and mandatory, they communicate with top-down processes but are not controlled by them; 4) the functions of continuation and

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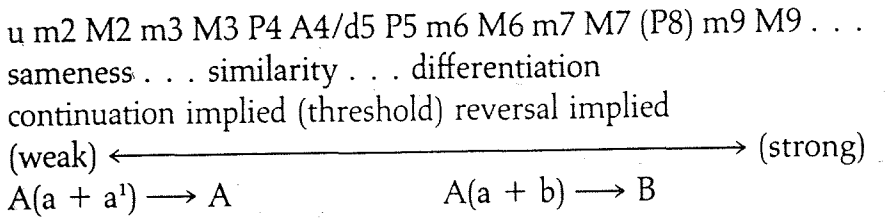
[11]I will discuss later an apparent inconsistency of terminology caused by this position.

[12]The perfect fourth, perfect fifth, and tritone may imply either continuation or reversal, depending on context; the octave is a special case which Narmour deals with separately.

reversal are constants.[13] Next Narmour briefly discusses the role of scale step, citing here studies such as those of Krumhansl, showing the primacy of certain scale steps over others. Using this type of research as a basis, Narmour separates melodic scale steps into three categories: goal notes, nongoals, and mobile notes. In the major mode, scale steps 1, 3, and 5 are goal notes; 2, 4, and 6 are nongoals; and 7 is a mobile note.[14] Within the implication-realization model, scale step functions as a learned, top-down schema (i.e., a style structure) which can interfere with intervallic implications, but does not generate them.

Example 1. Diagram of the intervallic parametric scale (78)



Next, Narmour defines intervallic similarity, necessary for his use of Gestalt relations. Similarity is defined as a differential of a minor third or less. Thus a major second followed by major third represents an example of intervallic similarity, as would a major third followed by a perfect fourth. This becomes important in several types of realization.

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[13]Syntactic parametric scales as Narmour defines them are closely related to input systems in faculty psychology. For a concise and very readable introduction to faculty psychology, see Jerry A. Fodor, *The Modularity of Mind: An Essay on Faculty Psychology* (Cambridge: MIT Press, 1983).

[14]Narmour notes that scale steps 6 and 7 in minor mode, in either raised or lowered form, often both act as mobile notes, a factor not usually taken into consideration in perceptual studies.

One of the most important is process [P], the realization of both intervallic and registral implications. Registral process [VP] results from denial of intervallic realization but realization of registral implication.

Duration and metric implication are not discussed in depth at this point, except to point out that a continuation interval between two notes of similar duration implies that the next note will also be of similar duration. The issue of pitch specificity is also not dealt with in detail, except to mention mode as a limiting factor on the choices for continuation. In summary, implication in melody has five properties: 1) registral direction (V); 2) intervallic motion (I); 3) pitch specificity (mode); 4) time point (metric position); and 5) time span (duration).

Part 2 of the book provides detailed examinations of some of the basic melodic structures described above. Chapter 6 deals with two of the most basic structures and also gives Narmour's view of some very important theoretical concepts, including that of closure. Process is the simultaneous realization of registral direction, interval similarity, and pitch proximity. Duplication is exactly what the name implies, although Narmour notes a few differences between his view of repeated notes and the traditional view held by most theorists, including Schenkerians. Most theories reduce repeated notes to single tones; Narmour holds that repeated notes are implicative in themselves, and thus have importance in themselves. This seems quite logical—why else would composers use repeated notes if they weren't important in some way?—yet not sufficiently recognized by traditional theory.

Narmour's definition of closure is different from most, but also somewhat confusing in its presentation. According to Narmour, closure can occur in varying degrees and does not necessarily signify transformation or the creation of new structural levels.[15] Many theorists think of closure only in the sense of major parametric events; Narmour claims his definition is not that narrow, repeating the three levels of closure mentioned earlier. The six parametric conditions of closure are:

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[15]Narmour does not define what he means by structural level.

1: simple stopping (by rest, onset of another structure, repetition of a pattern)
2: strong metric emphasis
3: consonance resolving dissonance
4: duration moving cumulatively
5: intervallic motion is large to small
6: registral direction changes

The problem is that these six parametric conditions of closure all seem to be related to low- or medium-level closure: none seem to deal with high-level closure. This situation would have probably been helped by a clearer explanation of Narmour's understanding of transformation and closure. Narmour has not yet offered any definition of what he means by transformation, except that he defines it "in the usual psychological or theoretical sense of the word" (102).

Narmour now explains the analytical notation that he uses in this book. Gone is the arrow-tail notation which Narmour used in *Beyond Schenkerism* and other early work. Instead there is a system of brackets labeled according to the structure in operation, with the understanding that the arrows are implied.

Since some implications will not be realized, there must be some means of explaining how implications are suppressed. For Narmour, this often happens through interference from other parameters. In the case of duplications, this most often happens through the influence of duration and meter.[16]

Of course implication can be denied, and Chapter 7 explores how this can happen. First comes the effect of style. The mode of pitch continuation is often a "top-down, style-structural impingement" of scale steps (123). This seems unclear at first, given Narmour's earlier assertion that mode is a style shape, not a style structure. However, it becomes clear later in the chapter that Narmour makes a definite distinction between the set of intervals that forms a scale and the highly complex relationships that form scale-step hierarchies.

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[16]Narmour notes that durational interference often coincides with metric interference.

The next major topic is registral return. While this phenomenon can be as simple as a neighbor note, by expanding the concept to include near registral return Narmour makes the complex much richer. In addition, Narmour redefines the notion of intervallic similarity when register changes: it is not the same as when the registral direction remains constant. Intervallic similarity when registral return is involved is defined by the major second, not the minor third as when direction is constant.

While implication of continuation is one basic principle of the implication-realization model, implication of reversal is another. Narmour concedes that there is little psychological evidence to support this concept, but it is nonetheless important if only as the logically opposite construction to continuation. Other musicians have noted this phenomenon as well.[17] Reversal, symbolized [R], refers to both implied change in registral direction and implied reduction of interval size. In Narmour's symbolic terms, if continuation is represented as A(a + a) → A, then reversal is represented as A(a + b) → B. Complementing the definition of continuation intervals presented earlier, reversal intervals are defined as perfect fifths or larger.[18]

Narmour then begins a very interesting discussion on determining the strength of implication. The basic rule is: the larger the interval, the less specific the implication, and the less specific the implication, the stronger the implication. This leads to the possibility of evaluating the degree of closure, a recurring theme in the book. With respect to reversal, the subject at hand, there are three basic rules for determining degree of closure (158):

1. Formal rule: greater intervallic differentiation results in

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[17]See, for example, Meyer's discussion of the need for closure underlying the gap-fill archetype in *Explaining Music* (8); compare also Wallace Berry's notion of progressive and recessive melodic action, in his *Structural Functions in Music* (Englewood Cliffs: Prentice-Hall, 1976), 86-87.

[18]Perfect fourths, tritones, and perfect fifths are transition intervals, capable of implying either continuation or reversal, with the perfect fourth tending toward continuation, the tritone being ambiguous, and the perfect fifth tending toward reversal.

greater closure

2. Function rules:
   a. the stronger the implication of the initial interval, the stronger the closure
   b. the weaker the implication of the terminal interval, the stronger the closure
3. Serial position rule: if implication of the initial interval is equal, then the weaker implication of the terminal interval results in stronger closure.

A discussion of the effects of duration, metric location, and harmony leads to one of the more interesting parts of this chapter, the discussion of embedded structures. This is Narmour's first extended discussion in the book of hierarchical levels and transformation, although the reader must keep in mind that he is not anywhere close to discussing hierarchy with respect to top-down structures: this discussion is all restricted to bottom-up processing. In this context, Narmour depends heavily on relative duration and metric position to establish these levels, relying especially on the privileged ratio of 2:1 (or 1:2).[19]

Intervallic reversal is created not by denial of registral direction but realization of intervallic motion. As with other structures, suppression of implication often occurs when closure in harmony, duration, or meter (or a combination of two or more of these parameters) is stronger than the nonclosural implication of melodic pitch. There is also more discussion in this chapter of the embodiment and transformation of surface patterns in higher-level patterns.

Narmour discusses some psychological factors related to duration. While there is evidence to suggest the reduction of complex durational ratios to simple ratios, there is also evidence that metric hierarchies play a crucial role in rhythmic perception: ". . . meter figures in the closural evaluation of durational cumulation in that it indicates to the

[19]Readers interested in psychological justification for the choice of this ratio will find numerous studies indicating that listeners tend to reduce complex duration ratios to simple ratios such as 2:1 or 3:1.

listener whether the metrically specified place of the realization has passed by'' (193).

Narmour then proceeds into the first substantive discussion of hierarchy in the book. The subject is approached through the concept of ''embodiment'' of a suppressed lower-level pattern. The structural tones in this pattern (generally the first and last) are transformed to the next level, where their implications are finally realized. This is a significant difference between Narmour's view of hierarchy and the view of most traditional ''reductive'' models of musical structure. In the traditional models, higher level structures assimilate or subsume lower-level structures: in a sense the lower-level structures ''disappear'' in the higher levels of structure. In Narmour's model, however, implication generated by lower-level patterns, when suppressed at this lower-level, is transferred to the higher level, so that the lower-level pattern remains attached to the higher-level pattern.[20]

In Chapter 11, Narmour deals with the interaction between melodic perception and meter. The symbol for metric influence, (b), does not refer to beat, pulse, accent or stress. Rather, it refers to metric differentiation that, together with activity in some other parameter, partitions and transforms a melodic tone regardless of accent/nonaccent status and regardless of level. Naturally, a difficulty of dealing with meter is that it is the result of interactions among all operative parameters.[21] Narmour then goes on to discuss relationships between melodic structures and meter. In short, melodic closure can influence the establishment of meter and transformation in contexts of additive rhythms (where duration will not establish meter). Narmour defends this arrangement against a possible logical problem noted by Yeston: that rhythm-to-pitch and pitch-to-rhythm structures must be kept separate to avoid a circular argument. Narmour notes that in this system pitch and metric hierarchies are established separately and

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[20]Noncongruence between lower-level implication suppression and higher-level patterning is a topic planned for the third book.

[21]The reader may be reminded of Joel Lester's remark that rhythm exists in all other parameters of music, yet it cannot exist without them.

usually operate separately. Narmour also recognizes the difficult factor of textual meter, noting that it may coincide or conflict with musical meter (or may have no effect at all, depending on the context). In closing, Narmour acknowledges that meter is a "vast and elusive" subject and that his treatment is nowhere near a final answer, but still one must attempt to deal with the subject (218).

Chapter 12 is one of the more interesting in the book, because it provides one of the first glimpses of the larger scope of the model, as well as its relation to other well-known theoretical models. A question which might arise as a natural consequence to the discussion of a concept such as reversal is how Narmour's view of these structures compares to the views of similar structures by other theorists. Narmour refers to the common melodic structure of a large leap followed immediately by extended stepwise motion in the opposite direction. Meyer calls these examples of a gap-fill archetype, while Schenkerian analysis generally treats these structures as resulting from a move from an inner voice to an outer voice, which Narmour calls interval filling. Narmour notes a distinct difference in cognitive orientation between these two concepts: Meyer's is prospective, while Schenker's is retrospective. This difference in orientation leads to different functions for the first note of the leap: in Meyer's view, the first note is an equal partner with the second, while in Schenker's view the first note, being part of an inner voice, is subsidiary to the second. In Narmour's view these two concepts represent two distinctly different types of pattern: the first represented as reversal followed by process [RP], the second as a dyad followed by process. Finally, Narmour notes that if the interval is to remain implicative, both notes of the interval must belong to the structure. While Schenker's approach seems to violate this principle, Narmour's view of the same structure maintains the importance of the first note.

As indicated earlier, the octave has a unique role in the implication-realization model. While its large size would lead one to expect reversal, the identity of pitch class and scale step often cause it to function as a closed dyad. With no interference from other parameters, the octave generally functions prospectively as a closed dyad. If it functions as a reversal, it is in retrospect. Other parameters,

such as duration, meter, and harmony, often clarify whether a given octave leap functions as closural or nonclosural.

There are certain conditions under which the octave can function prospectively as a reversal interval. These include: (1) the leapt-to note is dissonant; (2) the leaped-to note is in an extreme tessitura for the instrument; (3) influence of intra- or extraopus style. As before, Narmour places the burden of invoking style on the analyst. If there is a conflict between intra- and extraopus style, the influence of intraopus style generally supersedes that of extraopus style.

A retrospective reversal occurs when an interval that usually implies continuation realizes a reversal, and thus exhibits denial of both intervallic and registral implication. However, major seconds and smaller intervals imply continuation too strongly to realize reversal, so the intervals Narmour is concerned with here are the minor third through the perfect fourth. The two factors which can cause retrospective reversal are style influence (intra- or extraopus) and microparametric scales (to be discussed later). Influence of dissonance or harmony can also create prospective reversals out of thirds or fourths. In this chapter Narmour also discusses several other retrospective structures, including retrospective process and retrospective duplication. There is also a discussion of the role of retrospection in the perception of a musical "savant," someone who has overlearned a particular piece. The savant will not experience retrospection to the same degree as an ordinary listener will, because ". . . the cognitions of the savant would ascribe (os) [intraopus style] or (xs) [extraopus style] to every note of a piece they know inside and out" (278).

Chapters 15 through 19 delve deeper into the theoretical foundations of the theory. Chapter 15 deals with the concept of parametric scale, which, along with continuation and reversal, forms one of the major hypothetical foundations of the theory. Narmour's parametric scales are like traditional musical scales (major, minor, etc.) in that they measure distances and relative degrees of contrast between things. Yet they are also distinct from these traditional scales because they embody syntactic functions, such as degrees of closure or nonclosure. They also function ". . . regardless of, and in addition to

. . . intra- and extraopus style'' (284). Narmour explains his use of parametric scale by noting that experimental psychology has strongly suggested that scaling structures perception and cognition; it seems to be an inherent ability of both humans and animals (284). The ''slots'' in these scales can be filled by a variety of patterns, some of them acculturated: for example, the intervallic scale could be filled by the twelve-tone scale common in Western culture, or by a pentatonic or microtonal scale which might be found in other cultures.

Narmour also devotes a few paragraphs to possible analogues in other musical parameters. He notes, for example, that one could hypothesize parametric scales for dynamics, tempo, harmony, and duration. The concepts of continuation, reversal, and return would still be applicable in these parameters. While these ideas are intriguing, they are not explained in much detail; perhaps that will come in a future book as well. In the end, this possibility of a single guiding set of principles for numerous parameters seems to be what interests Narmour the most about the use of parametric scales: ''The advantage of conceiving syntactic parametric scales is that they offer the possibility of constructing one parsimonious set of theoretical rules to cover analogues among all the various parameters'' (291). An ambitious goal indeed, and one that many other theorists have sought as well.

Chapter 16 examines some of the difficulties of making analogues between different parameters, particularly between interval and register. The problem is that the intervallic parametric scale is made up of patterns, while the other scales are made up of individual elements.[22] There is some potential for confusion between the elements of the intervallic scale and the elements of the registral scale. While the intervallic scale consists, for Western ears, of the twelve intervals, and is thus tied to cultural learning, the registral scale really consists of just two elements: large and small intervals, with the threshold being

[22]The ''pattern'' being the two notes that make up each particular interval. It may be interesting to compare Lewin's notion of an interval as an action defining a space rather than a space defined by two points. From this viewpoint it could be argued that an interval is a single element as well. See David Lewin, *Generalized Musical Intervals and Transformations* (New Haven: Yale University Press, 1987).

somewhere around the tritone. As you can see, this definition is not tied to any cultural structure, but could operate in a twelve-tone culture, as well as in a pentatonic or microtonal culture. This distinction between elements and patterns results in a somewhat different cognitive status for interval and register: ". . . since [registral] elements (a + a) combine to make patterns (intervals), the registral scale (V) exists at a slightly lower cognitive level than the intervallic scale (I)" (295). To describe motion on the parametric scales, Narmour introduces two new terms, motion right (mR) and motion left (mL). Motion right is motion toward nonclosure, while motion left is motion toward closure.

One important element in this chapter is a more extended discussion of the three degrees of closure described earlier (articulative, formational, and transformational) and what intervallic and registral structures must be present in order for them to occur. This discussion is, however, entirely speculative: this is certainly one area which needs to be examined by psychological studies.

While Narmour clearly states that ". . . undertaking a thorough investigation of syntactic parametric scales is beyond the scope of this book. . . " (311), he recognizes the necessity of some discussion of the matter, because there are some important differences among the various parameters. The most important distinction is the number of directions that motion on the scale can take. As we have seen before, the registral scale is tridirectional (up, down, lateral). The scale of dynamics is ambidirectional, meaning that motion in either direction on the scale (crescendo or decrescendo) can be either closural or nonclosural, depending on context. Motion in harmony and duration, on the other hand, are unidirectional, meaning that particular motions are always closural or nonclosural. For example, a cumulative durational pair is always closural, while motion from a consonant to dissonant harmony is always nonclosural.

An important implication of this distinction is the cognitive "rank" of the various elements. Ambidirectional elements, such as dynamics and texture, are generally considered cognitively secondary because ". . . their scales differentiate materials but do not generate an internal syntax. Thus the syntactic meaning of secondary parameters . . . depends on syntactic function in the primary parameters. . ." (312).

Another difference in perception is that the unidirectional parameters (harmony and duration) lack the possibility of return; "closural dyads" are also possible in harmony and duration.

The final comments in this chapter deal with the perceptual relationships among harmony, duration, and melody. Because perceptual decisions can be made much more quickly in the parameters of harmony and duration than in melody, harmony and duration often interfere with implication of melody; but the reverse is rarely true. The domination of melody by harmony and duration, therefore, is not stylistic: it is a matter of perceptual constraints.

In Chapter 19 Narmour treats some aspects of the relationship between the elements and patterns that make up the parametric scales. Because of the influence of style learning, a listener can modify the patterns that make up the parametric scale in use. Narmour calls this a "micro-scale": a subset of the larger macro-parametric scale. The result of this micro-scale is that the implicative function of some intervals can change: if, for example, the largest interval in a micro-scale is a perfect fourth, then the fourth is much more likely to imply reversal than continuation (its function in the macro-scale). The result is that ". . . each work, each passage, literally creates its own parametric scale of specific registers and its own gamut of interval types" (321). This would seem to remove the influence of the macro-scale. However, it is still the controlling factor at the beginning of a piece (before a micro-scale has been established) and after strong closure. While he acknowledges the potential for some confusion between micro-scale and aspects of intraopus style, Narmour insists that these two concepts are independent, but does not describe the differences in great detail.

The next four chapters discuss thoroughly some of the melodic structures not given extensive treatment earlier. Chapter 20 contains a more detailed discussion of registral process and registral reversal. Most of the chapter consists of elaboration of concepts already covered, but there is an interesting discussion near the end of the chapter of the possibilities of interference between levels of style shapes.

The last of the eight basic melodic structures to be treated in detail, Intervallic Process, occurs when realization of intervallic

implication occurs while denial of registral and pitch implication takes place. Continuing intervallic processes produce registral return, which can cause overlapping higher-level structures, a significant cause of "streaming."[23] Because of the change in registral direction involved, intervallic processes possess some degree of internal closure (by the element of registral return). Depending on whether the intervallic process is motion left (mL) or motion right (mR), it will resemble either a reversal or registral reversal.

Having examined all of the basic melodic structures, Narmour now presents a ranking by degree of closure, from registral process (the most open) to reversal (the most closed). The rules stated in Chapter 8 are the primary guidelines for establishing these rankings.

Example 2. Ranking of melodic structural types from most open to most closed (361)

Structure	Intervallic Motion (I)	Registral Motion (V)	
VP	(NCL) mR/AB	(NCL) mR/AA	most open
P	(NCL) mR/AA	(NCL) mR/AA	
P, D	(NCL) mN/AA	(NCL) mR/AA, mN/AA	
P	(NCL) mL/AA	(NCL) mR/AA	
VR	(NCL) mR/AB	(CL) mL/AB	
IP	(NCL) mR/AA	(CL) mL/AB	
ID	(NCL) mN/AA	(CL) mL/AB	
IP	(NCL) mL/AA	(CL) mL/AB	
IR	(CL) mL/AB	(NCL) mR/AA	
R	(CL) mL/AB	(CL) mL/AB	most closed

[23]"Streaming" or "stream segregation" is the psychoacoustical term for the perception of two or more melodies out of a single melodic line. This phenomenon is quite familiar to music theorists as compound melody.

Narmour then discusses the question of virtual registral direction: up to this point, most discussion of register has been concerned only with relative change, not with direction. Narmour recognizes that there are significant differences in the ways that up, down, and lateral are perceived. Lateral motion has the weakest implication; ascending motion has the strongest implication. Narmour promises more explanation of "virtual registral direction" in the third book. Then follows an interesting discussion on the effects of harmony in which Narmour relates most of the common nonharmonic tones to his melodic structures.

Intervallic duplication is in most respects similar to intervallic process, except that nonmotion (mN) always obtains between the duplicated intervals. A continuing chain of intervallic duplications creates overlapping registral returns, as does intervallic process, but not the overlapping transformation that occurs with intervallic process: only the first and last tones are transformational.

Narmour closes Chapter 21 with a brief discussion of Carlsen's experiment on melodic expectancy.[24] Carlsen's study examined the responses that occurred when college music students were asked to sing a continuation of an initial interval. Narmour points out that some of Carlsen's results seem to support the basic hypotheses of the implication-realization model. For example, Carlsen found (to put Carlsen's results into Narmour's terms) a significant likelihood of continuation when the initial interval is an ascending or descending minor second, and a significant likelihood of reversal when the initial interval is an ascending minor sixth or minor seventh. Evidence from Carlsen's study also seemed to verify the "threshold" quality of the perfect fourth, tritone, and perfect fifth. Some results tend to disagree with Narmour's model, however: there was approximately equal likelihood of continuation and reversal for ascending major thirds (Narmour's model would predict continuation), and a high likelihood of continuation (rather than the expected reversal) for descending minor sevenths (374-375).

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[24]J. C. Carlsen, "Some Factors Which Influence Melodic Expectancy," *Psychomusicology* 1 (1981): 12-29.

Chapter 22 deals with registral return. Narmour states that registral return is present in musical structure at every level, from neighbor notes to large-scale tonal return. That last assertion may be a bit extreme, especially since it is scale step, not register, that determines tonal return. Narmour recognizes the importance of return but he insists that the mental processes involved in the perception of registral return are separate from those used in the perception of registral continuation or reversal. This is the reason for an additional analytical symbol (the symbol for registral return is [aba]), even though registral returns often overlap intervallic duplication or intervallic process. Unlike intervallic duplication and intervallic process, however, registral return is not usually implicative (but it does often produce transformation).

There is some discussion of the embodiment of implication on a higher level through patterns of registral return. This is again one of the several scattered places in the book where Narmour's understanding of musical hierarchy can be glimpsed in statements such as: ". . . since in a true hierarchical system higher-level implications embody certain relations of the transformed tones generated from lower-level patterns, registral return may weaken the implied registral direction on the higher level" (381); and "That all aba's [the symbol for registral return] embody implicative dyads—the last interval of the underlying pattern also has a bearing on discontiguous realizations on the low level since . . . all implications have a durational life beyond their immediate denial" (382). Narmour promises more on relationships between lower-level realization and higher-level implication in the third book.

Commentary

The great value of this book is that it attempts to build a comprehensive system of music analysis that is based on a solid model of music cognition. This model of music cognition is especially important for two reasons: (1) it includes lessons learned from recent experimental research in music cognition; and (2) it attempts to integrate top-down cognitive processes (a part of many analytical systems and models of

music cognition) with bottom-up processing, an area which has received little attention from music theorists, but about which there is much more experimental evidence. Ultimately the success of this integration can only be judged when the remaining volumes are completed, but this volume certainly lays a solid foundation.

There are, however, several significant problems with this book. One is the seemingly inconsistent use of certain terms. This is somewhat surprising in light of the fact that Narmour is generally very careful about defining terms and distinguishing his definition of those terms from conventional definitions when the two differ. One such example is "closure": in Chapter 5, while discussing the influence of style on the implication of continuation, Narmour describes a hypothetical instance where a learned style structure produces closure (74-75). In this case closure seems to be defined by the completion of a style structure. At most other points in the book, however, Narmour uses closure to refer to a property of style shapes. For example: "By *closure* I refer to syntactic events whereby the termination, blunting, inhibiting, or weakening of melodic implication occurs" (102). Thus, Narmour seems to be talking about two distinctly different concepts: one involving completion of style structures which is similar to the common use of the term in music theory, and another involving style shapes that seems to be more related to grouping of elements. Perhaps a different term for this latter type of closure would have been less confusing.

Another problem is definition of hierarchy and structural levels. The book contains few references in the way of definition of hierarchy, despite the fact that this is always a matter of great interest to music theorists. Anyone familiar with Narmour's previous work, especially his 1983 article on musical hierarchy,[25] certainly knows that when he speaks of hierarchy, Narmour means something rather distinct from what most music theorists mean. Narmour's concept of hierarchy is expressed in this book only in small pieces. It seems to be similar to that expressed in 1983, drawing more from notions of hierarchy in

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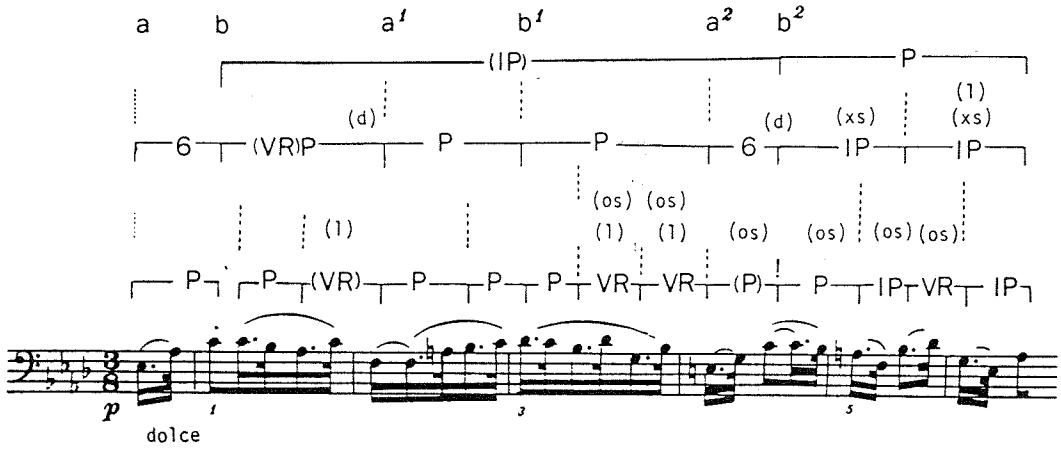
[25]Eugene Narmour, "Some Major Theoretical Problems Concerning the Concept of Hierarchy in the Analysis of Tonal Music," *Music Perception* 1/2 (1982-83): 129-199.

psychology than from traditional notions of hierarchy in music theory. Yet there are only scattered explanations in this book on this very important subject, none in great detail, so it may be difficult to understand for a reader not familiar with Narmour's earlier writings.

Also in relation to this matter of hierarchy, Narmour sometimes makes claims that are difficult to accept about certain higher-level structures. He insists that neither the top-down nor bottom-up processes have a direct relation to hierarchical level: both types can occur on all levels. Most readers would be hard-pressed to think of an example of a high-level, bottom-up process, however. Narmour does not give an example of such a process in the early chapters, where an example would have been very helpful.

Example 3. Narmour's Example 20.15



While we do encounter higher-level style shapes in later chapters, one may question how Narmour would account for the cognition of the high-level structures in the following example from Chapter 20. Given the constraints imposed by the phenomenon of the perceptual present (3-5 seconds), it is difficult to accept that a listener could process the highest level patterns, such as the (IP) spanning mm. 1-4, in an entirely bottom-up manner.[26] Cognition of such a lengthy pattern would certainly involve at least short-term memory. When memory is involved, there is necessarily an element of style-based processing in the cognition of a pattern.

Noting research that suggests that listeners base judgements of interval similarity on simple magnitude, Narmour constructs the intervallic parametric scale on absolute interval size, not on category identification. In other words, Narmour's view is that judgements of interval similarity do not use scale-step judgments such as thirds, fourths, and so forth. Despite this, the conventional labels are used consistently throughout the book. Perhaps conceptually it would have been better to borrow from pitch-class set theory and express intervals in terms of semitones to avoid this confusion entirely. Since Narmour attaches some significance to the tritone as the mediating interval in the octave, its designation as 6 (half of 12) would maintain that significance, while avoiding unwanted associations from the traditional interval labels. However, some studies suggest that intervals defined as scale steps possess a certain perceptual primacy over intervals defined in absolute terms.[27]

The organization of the book has both advantages and disadvantages. Narmour writes in something of a spiral manner. A

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[26]A check of three different recordings of this work yielded elapsed times of 7-8 seconds for this segment.

[27]See Gerald J. Balzano, "Musical vs. Psychoacoustical Variables and Their Influence on the Perception of Musical Intervals," *Bulletin of the Council for Research in Music Education* 70 (1982): 1-11; and Gerald J. Balzano and Barry W. Liesch, "The Role of Chroma and Scalestep in the Recognition of Musical Intervals in and out of Context," *Psychomusicology* 2/2 (1982): 3-31. While Narmour cites the *Pychomusicology* article elsewhere, he makes no mention of it in this context.

number of threads reappear throughout the book in various chapters. While this is partially necessary because of the large number of new and interdependent concepts in the book, it makes following a particular topic difficult. There are often substantial discussions of important topics in chapters whose titles give no hint of it. This situation is eased somewhat by a thorough index and appendices. Another problem is the organization of musical examples. While Narmour should be given credit for saving space (and paper) by "reusing" many analytical examples, the frequent references to and sometimes extended discussions of examples from other chapters are often awkward for the reader, particularly when examples from later chapters are used that contain unexplained analytical symbols. In fairness to Narmour, this could have been the publisher's decision, not the author's, but the problem remains nonetheless.

Narmour's writing style is persuasive, but at the same time often difficult and complex. To some extent, this complexity is a reflection of the wealth of sources he draws upon from other fields, such as mathematics, philosophy, cognitive science, experimental psychology, and semiotics.

Many problems of the book seem to be related to its status as the first volume of a multi-volume set, and thus may no longer be an issue when the future volumes are published. Noteworthy in this regard is the lack of sufficient explanation of how top-down processes fit into the model. Narmour has often been critical of what he regards as excessive orientation toward top-down structuring in traditional theory, so this omission may have been intentional in this first volume. He may be deliberately trying to distance himself from those traditional theories. Yet his theory would probably be more accessible to those same traditional theorists if there were a more detailed explanation from the beginning of how the top-down and bottom-up processes interact. Hopefully, the subsequent volumes promised by Narmour will address these issues.

A more detailed explanation of the interaction of top-down and bottom-up processes might also be informative to those interested in the pedagogical implications of such a model of perception. As an example, consider the following problem: if perception of style shapes is indeed

innate, hard-wired, and automatic, then it cannot be taught. Style structures must be learned, however, so the pedagogue would be interested in how an awareness of style shapes could be used to aid learning of style structures. This, of course, requires a deeper understanding of the interaction between top-down and bottom-up processing than Narmour has presented in this volume.

In summation, despite these problems this book should prove very valuable to anyone interested in theories of music that are based on solid cognitive foundations. While his early studies of melodic structure (*Beyond Schenkerism*, for example) were more or less elaborations of Leonard Meyer's work in *Explaining Music*, in this volume Narmour's work has developed far beyond that foundation. *The Analysis and Cognition of Basic Melodic Structures* represents the beginnings of the most thorough attempt to date to develop a method of musical analysis that incorporates basic, "bottom-up" cognitive functions of music perception into a comprehensive system of analysis, and this, perhaps, is its greatest value.